Space Weather Forecast

Issued on Thursday, 30 May 2024 at 12:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Ongoing likelihood of Moderate flares, and chance of isolated Strong flares. Chance of G1-G2/Minor to Moderate geomagnetic storm activity on Day 3 (1 June).

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity reached High levels during the last 24 hours, following a long duration strong flare at 29/1437UTC from a large, complex active region in the southeast.

There are currently seven numbered and two un-numbered regions on the visible disc. Of these there are two of main interest. The aforementioned region in the southeast, and also another large, complex region in the north-centre disc which has also given some moderate flare activity. Remaining regions are much smaller, magnetically simple and either stable or declining.

Initial modelling of the Coronal Mass Ejection (CME) following the 29 May strong flare indicates the chance of a glancing blow in the first half of Day 3 (1 June), with most of the ejecta expected to pass behind Earths orbit. This may be adjusted once further coronagraph imagery is available to give a fuller analysis. There were no other potentially Earth-directed CMEs observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds were indicated of slow wind conditions, with background speeds observed, around or below 370km/s. Interplanetary Magnetic Field (IMF) was initially weak but increased slightly to mostly moderate levels, with the north-south component predominately weak and positive (northward) until the UTC evening, when switching to negative (southward). Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary
Solar Activity: Moderate to High activity is expected with the large, complex spots in the southeast and north-centre disc the most likely sources.

Solar Wind / Geomagnetic Activity: Analysis is ongoing for the CME following the strong flare, with initial modelling indicating the chance of a glancing blow in the first half of Day 3 (1 June). This may be adjusted once further coronagraph imagery is available to give a fuller analysis. There were no other potentially Earth-directed Coronal Mass Ejections (CMEs) observed in available imagery.

Solar winds are likely to persist at background through Day 1 (30 May) and much of Day 2 (31 May). Day 3 (1 June) has a chance of a glancing CME from the strong flare. Otherwise, a small coronal hole could give just a modest increase in solar winds later in the period.

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Geomagnetic activity is expected to be mainly Quiet (Kp 0-2) until Day 3, when there is a chance of increasing to perhaps G1-G2/Minor to Moderate storm levels (Kp 5-6). Otherwise, some Unsettled periods may develop later in the period due to modest coronal hole influence.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background, with a slight chance of solar radiation storms given any further notable flares. These are most likely from the two most active spot regions in the northeast and southeast. The chances for a solar radiation storm will gradually increase as these regions transit westwards into more favourable geoeffective longitudes.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	20	40	10
Strong	G3	No	1	5	10	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	Yes	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	15	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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